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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,684	01/05/2004	Kai-Chi Chen	11845-US-PA	1683

31561 7590 08/11/2005

JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE
7 FLOOR-1, NO. 100
ROOSEVELT ROAD, SECTION 2
TAIPEI, 100
TAIWAN

EXAMINER	
QUACH, TUAN N	
ART UNIT	PAPER NUMBER
2826	

DATE MAILED: 08/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/707,684	CHEN ET AL.	
	Examiner	Art Unit	
	Tuan Quach	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-9 and 11-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3-9, 11-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

The response filed May 25, 2005 has been received and entered. Claims 2 and 10 are cancelled. Claims 1 and 9 are amended.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

In referencing the applied prior art, "et al." is omitted for convenience.

Claims 1,3-6, 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Combs taken with Eguchi.

Regarding claim 1, Combs (6,734,552) teaches (see Fig. 1, column 3 line 30 to column 4 line 32, column 6 lines 15 et seq.) a carrier 100, a chip 130 (the flipchip bonding as alternative is shown, Fig. 3, column), heat sink 110 over the chip, encapsulating material 140 filling a bonding gap between the chip and the carrier 100 and a gap between the heat sink and the chip, wherein the encapsulating material is formed in a simultaneous molding process and part of the surface 112 of the heat sink away from the chip is exposed. In addition, note that such product-by-process limitation is directed to the product per se, no matter how actually made. See *In re Thorpe et al., 227 USPQ 964 (CAFC, 1985)* and the related case cited therein which make it clear that it is the final product per se which must be determined in a "product-by-process" claim, and not the patentability of the process, and that, as here, an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product-by-process" claims or not. As stated in *Thorpe,*

> Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. *In re*

Brown, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA, 1972); In re Pilkington, 411 F.2d 1345, 1348, 162 USPQ 145, 147(CCPA 1969).

The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature" than when a product is claimed in the conventional fashion. *In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974).* Once the examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. *In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983)*

> "[T]he lack of physical description in a product-by-process claim makes determination of the patentability of the claim more difficult, since in spite of the fact that the claim may recite only process limitations, it is the patentability of the product claimed and not of the recited process steps which must be established. We are therefore of the opinion that when the prior art discloses a product which reasonably appears to be either identical with or only slightly different than a product claimed in a product-by-process claim, a rejection based alternatively on either section 102 or section 103 of the statute is eminently fair and acceptable. As a practical matter, the Patent Office is not equipped to manufacture products by the myriad of processes put before it and then obtain prior art products and make physical comparisons therewith." *In re Brown, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972).*

Combs thus lacks primarily the recitation of the particular dimension as maneded, namely the chip being separated from the heat sink by a distance between 0.03 and 0.2 mm as newly amended. Eguchi 6,627,997, teaches, e.g., at column 7 line 40, the

optimization of spacing between the chips and the heat spread plate to be as narrow as possible without forming voids and delamination, including the desired range of 10 to 200 μm. See column 2 line 49 to column 7 line 40. Accordingly, it would have been obvious to one skilled in the art in practicing the above invention to have optimized the distance or spacing between the heat sink and chip to the desired distance including those claimed wherein the spacing is as narrow as possible without formation of voids or delamination.

Regarding claim 4, the use of encapsulating material of resin is shown, column 56 line 19, e.g., an epoxy based material. Regarding claim 5, the heat sink comprising a metal is shown, column 5, lines 25-30. Regarding claim 6, the solder balls attached away from the carrier 100 correspond to structures 106.

Regarding claim 3, it would have been obvious to have selected and optimized the thermal conductivity of the encapsulating material, including those as claimed wherein thermal conductivity can be improved. Official notice is additionally given regarding the selection of conventional encapsulating materials having thermal conductivity greater than the claimed value.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Combs taken with Eguchi as applied to claims 1, 3-6, 8 above and further in view of Call.

The references as applied above do not recite the passive component.

Call (5,471,027) teaches the use of additional passive components, e.g., 28. See column 4 lines 39-48.

It would have been obvious to have included such passive components as taught by Call since such incorporation is conventional and permits the incorporation of additional electronic devices in addition to the semiconductor chips as taught by Call.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Combs taken with Eguchi as applied to claims 1, 3-6, and 8 above, and further in view of Huang.

The references as applied above do not recite the alternative of lead frame in claim 8.

Huang 6,844,622 teaches, Fig. 5, the use of lead frame 50 as chip carrier for chip 51. See column 7 line 30-35.

It would have been obvious to one skilled in the art in practicing the above invention to have employed the lead frame as chip carrier for chip 51 since such corresponds to an obvious alternative employing the lead frame as evidenced by Huang.

Claims 9, 11-18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Combs taken with Eguchi and Yang.

Combs and Eguchi are applied as above and does not recite the chip set comprising a plurality of chips as in claim 9, the second chip and first chip as in claim 12, the first chip, second chip, and third chip as in claim 14.

Yang 2003/0141582 shows stacked type flip chip package including flip chip of the second chip on the first chip. See Figs. 2 and 5 wherein the active surface of the first chip can join the board and wherein the active surface of the second chip joined to

the first chip in a flip chip fashion, e.g., chip 130 joined to chip 120. The provision of three chips joined in such fashion is also shown in Fig. 5 wherein chip 320 having active surface joined to the substrate board 310, the second chip 330 joined to first chip with active surface way, and the third chip 390 joined to the second chip in a flip chip fashion. The appropriate wire connections are also shown, e.g., 160, See [0019]-[0025].

It would have been conventional and obvious in practicing the above invention to have included the chip set comprising two chips or three chips as taught by Yang, including the respective surfaces being joined in the manner delineated above since such multichip is conventional and advantageous as taught by Yang permitting the formation of stack type flip chip package.

Regarding claim 11, it would have been obvious to have selected and optimized the thermal conductivity of the encapsulating material, including those as claimed wherein thermal conductivity can be improved. Official notice is additionally given regarding the selection of conventional encapsulating materials having thermal conductivity greater than the claimed value.

Regarding claims 13 and 15, the provision of appropriate conductive wires would have been conventional and obvious as shown above in Yang.

The provision of the heat sink comprising metal in claim 17 is taught in Combs delineated above. Regarding claim 18, the provision of solder balls corresponds to structure 106 well known as shown in Combs above.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Combs taken with Eguchi and Yang as applied to claims 9, 11-18 and 20 above, and further in view of Call.

The incorporation of the passive component would have been obvious for the same reason delineated above regarding claim 7 in view of Call.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Comnbs taken with Eguchi and Yang as applied to claims 9, 11-16, 18 and 20 above, and further in view of Huang.

The alternative of using lead frame in this claim would have been obvious for the same reason applied to claim 8 above in view of the teachings of Huang as delineated above.

Claims 9, 11-16, 18, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pu in view of Eguchi.

Regarding claims 9, 12, 14, Pu 6,610,560 teaches chip package structure comprising chip including first chip 210 bonded to second chip 210 in a flip chip bonding process creating a bonding gap a het sink 290 over the chip set, encapsulating material 270 filling the flip chip bonding gat and the chip set and the heat sink. See Fig. 2D, column 3 line 59 to column 5 line 20. The simultaneous bonding corresponds to a product-by-process feature and the rationale discussed above is applicable here and incorporated by reference. Eguchi 6,627,997, teaches, e.g., at column 7 line 40, the optimization of spacing between the chips and the heat spread plate to be as narrow as

possible without forming voids and delamination, including the desired range of 10 to 200 μm. See column 2 line 49 to column 7 line 40.

Although Pu does not recite the numerical spacing as claimed such optimization of appropriate spacing have been obvious as suggested by Eguchi. In particular, it would have been obvious to one skilled in the art in practicing the above invention to have optimized the distance or spacing between the heat sink and chip to the desired distance including those claimed wherein the spacing is as narrow as possible without formation of voids or delamination.

Regarding claim 11, it would have been obvious to have selected and optimized the thermal conductivity of the encapsulating material, including those as claimed wherein thermal conductivity can be improved. Official notice is additionally given regarding the selection of conventional encapsulating materials having thermal conductivity greater than the claimed value

Regarding claim 12, the provision of first active surface joined with the active surface of the second chip is shown in Fig. 2A. Regarding claim 13, the wires are shown, e.g., 211. Regarding claim 16, the resin is shown, column 4 line 46.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pu taken with Eguchi as applied to claims 9, 11-16, 18, 20 and further in view of Combs.

The use of heat sink including metal is well known in the art as taught by Combs delineated above and as such would have been obvious.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pu taken with Eguchi as applied to claims 9, 11-16, 18, and 20 above and further in view of Call.

The incorporation of the passive component would have been obvious for the same reason delineated above regarding claim 7 in view of Call.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pu taken with Eguchi as applied to claims 9, 11-16, 18, 20 above and further in view of Huang.

The alternative of lead frame carrier in this claim would have been obvious for the same reason as taught by Huang above for the reasons delineated above.

Applicant's arguments filed May 25, 2005 have been fully considered but they are not persuasive.

Applicant primarily argues that the spacing as claimed in claims 2 and 10 now incorporated in claims 1 and 9 is not obvious. Nonetheless, such optimization would have been obvious to one skilled in the art. See additionally, Eguchi at portions delineated above wherein the particular numerical range is also delineated to obtain a spacing that is as narrow as possible without forming voids or delamination.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Quach whose telephone number is (571) 272-1717. The examiner can normally be reached on M - F from 8:30 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Nathan Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-1562.

Tuan Quach
Primary Examiner